

SECTION 05500
MISCELLANEOUS METALS

PART 1 - GENERAL

0.1 DESCRIPTION OF WORK

- A. Work Included:** This Section specifies the following items.
 - 1. All Work in this Section; refer to Schedule in Par. 2.1 and as indicated on the Drawings.
- B. Items To Be Furnished Only:** Furnish the following items for installation by the designated Sections
 - 1. Section 03300 - CAST-IN-PLACE CONCRETE.
 - a. Lintels, sleeves, anchors, inserts, plates and similar items.
 - 2. Section 04800 - MASONRY:
 - a. Lintels, miscellaneous metal and iron sleeves, anchors, inserts and plates to be built into masonry walls.
- C. Related Work:** The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 05100 - STRUCTURAL STEEL; structural steel items.
 - 2. Section 10605 - WIRE MESH PARTITIONS; for interior wire mesh partitions.

0.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Ladders:** Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- B. Thermal Movements:** Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.

0.3 SUBMITTALS

- A.** Product Data: For paint products.
- B.** Samples: Two three by six inch samples of shop-applied finishes, in color selected.
- C.** Shop Drawings: Show fabrication and installation details for metal fabrications.
 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 2. Provide templates for anchors and bolts specified for installation under other Sections.
 3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the Commonwealth of Massachusetts responsible for their preparation.
 4. Where fabrications are to receive sprayed-on fireproofing, include statement that primer is compatible with fireproofing proposed for use.
- D.** Certificates: Welder and weld procedure qualifications.
- E.** Qualifications for Inspection and Testing Agency and Contractor's professional engineer indicating registration in the Commonwealth of Massachusetts.
- F.** Weld inspection reports.

0.4 QUALITY ASSURANCE

- A.** Welding: Qualify procedures and personnel according to the following:
 1. AWS D1.1, "Structural Welding Code--Steel".
 2. AWS D1.2, "Structural Welding Code--Aluminum".
 3. AWS D1.3, "Structural Welding Code--Sheet Steel".
 4. AWS D1.6, "Structural Welding Code--Stainless Steel".
- B.** Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- C.** Galvanizer Qualifications: Engage the services of a qualified galvanizer who has demonstrated a minimum of five years experience in the successful application of galvanized coatings specified in this Section in the facility where the work is to be performed and who will apply the coatings within the same facility.

- D.** Pre-Installation Conference: Contractor shall schedule a meeting to be attended by Contractor, Engineer, fabricator, and galvanizer prior to starting Work. Agenda shall include the following: Project schedule, source for each fabrication, coordination between fabricator and galvanizer and adjacent Work, finish of surfaces, application of coatings, submittals, and approvals.
- E.** Inspection. Except as otherwise specified, only visual inspection of welds, materials, workmanship, finished products, and installation is required.

0.5 PROJECT CONDITIONS

- A.** Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings. Provide allowance for trimming and fitting at site.

0.6 COORDINATION

- A.** Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B.** Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

0.1 SCHEDULE

- A.** Metal fabrications include, but are not limited to, the following. Requirements for materials and coatings/finishes which are included as part of the Work specified in this Section are listed with each item.

	ITEM	MATERIAL	COATING/FINISH
1.	Interior Handrails and Railings	Steel Stainless Steel	Primer No. 4 finish
2.	Exterior Handrails and Railings	Steel Stainless Steel	Galv/Primer/finish No. 4 finish
3.	Interior lintels	Steel	Primer
4.	Interior ladders	Steel	Primer
5.	Exterior ladders	Steel Aluminum	Galv Anondized
6.	Exterior ladder safety cages	Steel	Galv.

		Aluminum	Anondized
7.	Elevator pit ladders	Steel	Gal/primer
8.	Elevator doorsill support angles	Steel	Gal/primer
9.	Elevator hoistway beams	Steel	Primer
10.	Metal floor plate	Steel	Galv
11.	Shelf angles	Steel	Gal/primer/finish
12.	Bollards	Steel	Gal Gal/primer
13.	Loose bearing and leveling plates	Steel	Galv
14.	Weld plates and angles	Steel	Galv
15.	Areaway gratings	Steel	Galv
16.	Supports for canopies	Steel	Gal/primer/finish
17.	Supports for coiling doors	Steel	None
18.	Supports for operable partitions	Steel	None
19.	Supports for countertops	Steel	Primer
20.	Roof anchors for window washing	Steel	Galv
21.	Pipe Guards	Steel	None
22.	Abrasive nosings	Cast iron	None
23.	Wheel guards	Cast iron	None

0.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316L
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L
- D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- E. Steel Tubing: ASTM A 500, cold-formed steel tubing.

- F.** Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- G.** Slotted Channel Framing: Cold-formed metal channels with continuous slot complying with Metal Framing Manufacturers Association MFMA-3.
- H.** Cast Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

0.3 NONFERROUS METALS

- A.** Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- B.** Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- C.** Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- D.** Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

0.4 FASTENERS

- A.** General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, within exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
- B.** Anchor Bolts: ASTM F 1554, Grade 36. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- C.** Cast-in-Place Anchors in Concrete: Anchors shall be capable of sustaining, without failure, a load equal to four times the load imposed. Tests shall be as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- D.** Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488. Tests shall be conducted by a qualified independent testing agency.
 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 2. Material for Anchors in Exterior Locations: Stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

0.5 MISCELLANEOUS MATERIALS

- A.** Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B.** Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with The Society for Protective Coatings SSPC-Paint 20 or ASTM A780.
- C.** Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D.** Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

0.6 FABRICATION, GENERAL

- A.** Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B.** Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C.** Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D.** Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E.** Weld corners and seams continuously to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F.** Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

- G.** Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H.** Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I.** Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

0.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A.** General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B.** Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts if units are installed after concrete is placed.
- C.** Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

0.8 LOOSE STEEL LINTELS

- A.** Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.
- B.** Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches, unless otherwise indicated.

0.9 SHELF ANGLES

- A.** Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
 - 1. Provide mitered and welded units at corners.

2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

0.10 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

0.11 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

0.12 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

0.13 METAL LADDERS

A. Provide metal ladders complying with ANSI A14.3, except elevator pit ladders, comply with ASME A17.1. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted brackets, made from same metal as ladder. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

0.14 LADDER SAFETY CAGES

- A.** Provide ladder safety cages complying with ANSI A14.3. Assemble by welding or with stainless-steel fasteners.

0.15 METAL SHIPS' LADDERS

- A.** Provide metal ships' ladders where indicated. Fabricate of open-type construction with channel or plate stringers, pipe and tube railings, and bar grating treads, unless otherwise indicated. Provide brackets and fittings for installation.

0.16 METAL BOLLARDS

- A.** Fabricate metal bollards from Schedule 40 steel pipe.
- B.** Fabricate bollards with 3/8-inch-thick steel baseplates for bolting to concrete slab. Drill baseplates at all 4 corners for 3/4-inch anchor bolts. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

0.17 PIPE GUARDS

- A.** Fabricate pipe guards from 3/8-inch-thick by 12-inch wide steel plate, bent to fit flat against the wall or column at both ends and to fit around pipe with 2-inch clearance between pipe and pipe guard. Drill each end for two 3/4-inch anchor bolts.

0.18 METAL FLOOR PLATE

- A.** Fabricate from rolled-steel floor plate of minimum 1/4 inch steel unless thicker units are required for anticipated loadings.
- B.** Include steel angle stiffeners, and fixed and removable sections as indicated.
- C.** Provide flush steel bar drop handles for lifting removable sections, one at each end of each section.

0.19 ABRASIVE METAL NOSINGS

- A.** Cast-Iron Units: Cast gray iron, Class 20 with an integral abrasive finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions.

- B.** Drill for mechanical anchors and countersink. Locate not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.
- C.** Apply bituminous paint to concealed bottoms, sides, and edges of cast-metal units set into concrete.

0.20 CAST-IRON WHEEL GUARDS

- A.** Provide wheel guards of 3/4-inch-thick, hollow-core, gray-iron castings; of size and shape indicated. Provide holes for countersunk anchor bolts and grouting.

0.21 FINISHES, GENERAL

- A.** Comply with the National Association of Architectural metal Manufacturer's (NAAMM) "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B.** Finish metal fabrications after assembly.

0.22 STEEL AND IRON FINISHES

- A.** Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Urethane Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning".
 2. Interiors (SSPC Zone 1A): SSPC-SP 7, "Brush Off Blast Cleaning".
 3. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be field welded, embedded in concrete or masonry, unless otherwise indicated. Extend priming of partially embedded members to a depth of 2 inches.
 4. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel", for shop painting.
 5. Comply with SSPC-PA 2, "Measurement of Dry Coating Thickness with magnetic Gages".
- B.** Hot-Dip Galvanizing: For steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dip process. Comply with ASTM A 123 for fabricated products and ASTM A 153 for hardware. Provide thickness of galvanizing specified in referenced

standards. The galvanizing bath shall contain high grade zinc and other earthly materials. Fill vent holes and grind smooth after galvanizing.

C. Hot-Dip Galvanizing And Factory-Applied Primer for Steel: Provide hot-dip galvanizing and factory-applied prime coat, certified OTC/VOC compliant less than 2.8 lbs/gal. and conforming to EPA and Commonwealth of Massachusetts requirements. Apply primer within 12 hours after galvanizing at the galvanizer's plant in a controlled environment meeting applicable environmental regulations and as recommended by the primer coating manufacturer. Blast cleaning of the surface is unacceptable for surface preparation. Primer shall have a minimum two year re-coat window for application of finish coat. Coatings must meet or exceed the following performance criteria:

1. Abrasion: ASTM D 4060, CS17 Wheel, 1,000 gram load.
2. Adhesion: ASTM D 3359, Method B, 5 mm crosshatch.
3. Humidity Resistance: ASTM D 4585.
4. Salt Spray (Fog): ASTM B 117.

D. Hot-Dip Galvanizing and Factory-Applied Urethane Primer and Finish for Steel: Provide factory-applied architectural coating over primed hot-dip galvanized steel matching approved samples.

1. Primer coat shall be factory-applied polyamide epoxy primer. Apply primer within 12 hours after galvanizing at the galvanizer's plant in a controlled environment meeting applicable environmental regulations and as recommended by the primer coating manufacturer.

2. Finish coat shall be factory-applied color-pigmented architectural finish. Apply finish coating at the galvanizer's plant, in a controlled environment meeting applicable environmental regulations and as recommended by the finish coating manufacturer.

3. Coatings shall be certified OTC/VOC compliant and conform to applicable regulations and EPA standards.

4. Apply the galvanizing, primer and coating within the same facility and provide single-source responsibility for galvanizing, priming and finish coating.

5. Blast cleaning of the galvanized surface is not acceptable.

6. Primer shall meet or exceed the following performance criteria:

- a. Abrasion: ASTM D 4060, CS17 Wheel, 1,000 gram load.
- b. Adhesion: ASTM D 3359, Method B, 5 mm crosshatch.
- c. Humidity Resistance: ASTM D 4585.
- d. Salt Spray (Fog): ASTM B 117.

7. Finish coat shall meet or exceed the following performance criteria:

- a. Abrasion: ASTM D 4060, CS17 Wheel, 1,000 gram load.
- b. Adhesion: ASTM D 3359, Method B, 5 mm crosshatch.
- c. Graffiti Resistance: After drying for seven days, no staining from acrylic, epoxy, epoxy-ester and alkyd spray paints, ballpoint pen, crayons, magic marker, black shoe polish, and lipstick.

- d. Weathering: ASTM D 1014, 45 degrees facing south.
- e. Surface Burning Characteristics: ASTM E 84
- f. QUV: ASTM G53, ES-40 bulbs, 4 hours light, 4 hours dark.
- g. Salt Spray (Fog): ASTM B 117.

8. Clearcoat over finish coat shall meet or exceed the following performance criteria:

- a. Abrasion: ASTM D 4060, CS17 Wheel, 1,000 gram load.
- b. Adhesion: ASTM D 3359, Method B, 5 mm crosshatch.
- c. Graffiti Resistance: After drying for seven days, no staining from acrylic, epoxy, epoxy-ester and alkyd spray paints, ballpoint pen, crayons, magic marker, black shoe polish, and lipstick.
- d. Weathering: ASTM D 1014, 45 degrees facing south; and ASTM D 4141C EMMAQUA-NTW.
- e. QUV: ASTM G53, ES-40 bulbs, 4 hours light, 4 hours dark.
- f. Salt Spray (Fog): ASTM B 117.
- g. Flexibility: ASTM D 522, Method B, cylindrical mandrel.
- h. Hardness: ASTM D 3363 (Pencil).

E. Zinc-Rich Primer: Urethane zinc rich primer compatible with topcoat Specified in Section 09900. Provide primer with a VOC content of 340 g/L (2.8 lb/gal.) or less per OTC ozone standards when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Provide Tnemec Series 394 Perimerprime or Ameron Series 68HS at 3.0 mils DFT or approved equal by DuPont or Carbofine.

0.23 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean. Remove all heat tint at welds and heat affected zones.

0.24 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

0.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement:** Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints.** Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding:** Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction:** Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.**
- F. Corrosion Protection:** Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

0.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General:** Install framing and supports to comply with requirements of items being supported, including manufacturer's written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.**
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns.** Secure girders with anchor bolts embedded in grouted masonry

or concrete or with bolts through top plates of pipe columns. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in this Section.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in this Section. Grout baseplates of columns supporting steel girders after girders are installed and leveled

0.3 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

0.4 INSTALLING PIPE BOLLARDS

A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

0.5 INSTALLING PIPE GUARDS

A. Provide pipe guards at exposed vertical pipes in parking garage where not protected by curbs or other barriers. Install by bolting to wall or column with expansion anchors. Provide four 3/4-inch bolts at each pipe guard. Mount pipe guards with top edge 26 inches above driving surface.

0.6 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

A. Center nosings on tread widths.

B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.

- C. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 7 Section "Joint Sealants" to provide a watertight installation.

0.7 INSTALLING CAST-IRON WHEEL GUARDS

- A. Anchor wheel guards to concrete or masonry construction to comply with manufacturer's written instructions. Fill cores solidly with concrete.

0.8 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

PART 4 - MEASUREMENT AND PAYMENT

0.1 MEASUREMENT

- A. No separate measurement will be made for miscellaneous metal items, but all costs in connection therewith shall be included in the lump sum price for miscellaneous metals except as otherwise noted. All preparation and incidental work necessary to accomplish the installation, including all bolts, anchors, washers, galvanizing, factory painting, etc., will be considered incidental to the Lump Sum price.

0.2 PAYMENT

- A. Payment for miscellaneous metal items will be made at the Contract lump sum prices as specified above.

0.3 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0550.000	MISCELLANEOUS METALS	LS

END OF SECTION

NOTES TO THE DESIGNER

- A.** Any request to modify or waive the specification requirements listed below must be approved in writing by the MBTA's Director of Design:
 - 1. All stainless steel specified for exterior applications shall be Type 316 or 316L stainless steel.